

AMENDMENTS TO THE CLAIMS:

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1. (Previously Presented) A method comprising:

preparing a bonding surface of a heat dissipating member; and

bonding a thermal interface material layer including a metallic solder to the bonding surface, the thermal interface material layer to thermally couple the heat dissipating member to a heat conducting component by an impermanent attachment, the bonding including providing at least the thermal interface material in a vacuum chamber under vacuum conditions and heating the thermal interface material in the vacuum chamber to form liquid metallic solder.
2. (Original) The method of claim 1, wherein the bonding of the thermal interface material is achieved without using a solder flux.
3. (Original) The method of claim 1, wherein the bonding of the thermal interface material comprises forming an intermetallic bond.
4. (Original) The method of claim 1, wherein the preparing of the bonding surface comprises plating the bonding surface with at least one wetting layer.

5. (Previously Presented) The method of claim 4, wherein the at least one wetting layer comprises one of gold (Au) and nickel (Ni).
6. (Original) The method of claim 1, wherein the metallic solder has a melting point that is greater than an operating temperature of the heat conducting component.
7. (Original) The method of claim 1, wherein the metallic solder comprises one of indium and an alloy thereof.
8. (Previously Presented) The method of claim 1, wherein the heat dissipating member comprises one of copper (Cu) and aluminum (Al).
9. (Original) The method of claim 1, wherein the bonding comprises:
reflowing the metallic solder on at least a portion of the bonding surface to form a liquid metallic solder layer; and
allowing the liquid metallic solder layer to cool to a temperature of less than the melting point of the metallic solder.

Reply to Office Action dated May 8, 2006

10. (Previously Presented) The method of claim 1, wherein the bonding comprises:

placing the metallic solder and the heat dissipating member into the vacuum chamber;

placing the vacuum chamber under vacuum conditions;

heating the metallic solder to a temperature of greater than or equal to the melting point of the metallic solder to form the liquid metallic solder; and

disposing the liquid metallic solder on at least a portion of the bonding surface to form a liquid metallic solder layer.

11. (Currently Amended) The method of claim 10, ~~further comprising wherein the bonding further comprises~~ providing a first inert environment in the vacuum chamber after placing the vacuum chamber under vacuum conditions.

12. (Original) The method of claim 11, ~~further comprising wherein the bonding further comprises~~ providing a pressure environment in the vacuum chamber after providing a first inert environment in the vacuum chamber.

13. (Previously Presented) The method of claim 12, wherein the pressure environment is from about 15 to about 40 pounds per square inch (p.s.i.).

14. (Currently Amended) The method of claim 12, wherein the bonding further comprising comprises:

allowing the liquid metallic solder layer to cool to a temperature of less than the melting point of the metallic solder; and

removing at least a portion of the second pressure environment from the vacuum chamber.

15. (Original) A method comprising:

placing a metallic solder and a heat dissipating member having a bonding surface into a vacuum chamber;

placing the vacuum chamber under vacuum conditions;

heating the metallic solder to a temperature of greater than or equal to the melting point of the metallic solder to form a liquid metallic solder;

providing a pressurized inert atmosphere in the vacuum chamber;

disposing the liquid metallic solder on at least a portion of the bonding surface to form a liquid metallic solder layer;

removing at least a portion of the pressurized inert atmosphere from the vacuum chamber; and

allowing the liquid metallic solder layer to cool to a temperature of less than the melting point of the metallic solder.

Reply to Office Action dated May 8, 2006

16. (Original) The method of claim 15, wherein the metallic solder comprises a fluxless metallic solder.

17. (Currently Amended) The method of claim 15, further comprising providing a wetting layer including one of a gold (Au) plating and a nickel (Ni) plating on the bonding surface prior to placing the heat dissipating member into the vacuum chamber.

18-30. (Canceled)

31. (Currently Amended)) A method comprising:

- providing a metallic solder in a vacuum chamber under vacuum conditions;
- heating the metallic solder to at least a melting temperature of the metallic solder while in the vacuum chamber;
- providing a pressurized inert atmosphere in the vacuum chamber while the metallic solder is in the vacuum chamber;
- providing the heated metallic solder onto a bonding surface while the metallic solder is in the vacuum chamber; and
- allowing the heated metallic solder to cool to a temperature less than the melting point of the metallic solder.

32. (Previously Presented) The method of claim 31, wherein the inert atmosphere comprises a nitrogen atmosphere or an argon atmosphere.

33. (Previously Presented) The method of claim 31, wherein providing the metallic solder in the vacuum chamber under vacuum conditions includes removing a portion of an initial atmosphere from the vacuum chamber.

34. (Previously Presented) The method of claim 33, wherein removing a portion of an initial atmosphere includes removing an amount of oxygen gas from the vacuum chamber.

35. (Previously Presented) The method of claim 31, further comprising removing at least a portion of the inert atmosphere from the vacuum chamber.

36. (Previously Presented) The method of claim 31, wherein providing the heated metallic solder onto the bonding surface includes bonding the heated metallic solder to the bonding surface without a solder flux.

37. (Previously Presented) The method of claim 1, wherein the bonding includes providing an inert environment in the vacuum chamber prior to heating the thermal interface material.

38. (Previously Presented) The method of claim 37, wherein the bonding further includes providing a pressurized environment in the vacuum chamber after providing the inert environment.

39. (Previously Presented) The method of claim 38, wherein the bonding further includes providing the liquid metallic solder on the bonding surface.

40. (Previously Presented) The method of claim 39, wherein the bonding further includes removing at least a portion of the inert atmosphere from the vacuum chamber.

41. (Previously Presented) The method of claim 40, wherein the bonding further includes allowing the liquid metallic solder layer to cool.

42. (Previously Presented) The method of claim 15, wherein the placing the vacuum chamber under vacuum conditions includes removing a portion of an initial atmosphere from the vacuum chamber.

43. (Previously Presented) The method of claim 42, wherein removing the portion of the initial atmosphere includes removing oxygen gas from the vacuum chamber.